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A simulation model for the spread of LA-MRSA within a pig herd

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Objectives

- Study the mechanisms of MRSA spread and persistence within a pig herd.
- Examine the short and long term consequences and cost-effectiveness of different control strategies.

Materials and methods

- Mechanistic Monte Carlo simulation in R.
- Parameterization by existing data, data harvested in other part of the OHLAM project and expert opinions.

Background

- Livestock-associated methicillin-resistant *Staphylococcus aureus* (LA-MRSA) is an opportunistic human pathogen.
- LA-MRSA has main reservoir in pigs, but it has also been isolated from other animals and the environment.
- In 2014, LA-MRSA was found in 68% (N=207) and 63% (N=70) of the Danish production and nucleus/multiplier herds.*

*Source: Danish Food and Veterinary Administration.

Possible influence of ...

Transmission of MRSA between stable units?

Emission of MRSA from a pig herd through air?

Emission of MRSA with pigs?

Hygiene interventions among staff?

Cleaning and disinfection?

Transmission of MRSA within a unit?

Emission of MRSA with humans leaving the herd?

Use of probiotics?

Test-and-isolate until slaughter?

Transmission of MRSA within a pen?

Different routes of introduction?

Perinatal transmission from sow to offspring?

Spread of MRSA with humans and equipment?

Persistently colonized pigs?

Test-and-cull among super-carrier pigs?

Changes in antimicrobial consumption patterns?



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